ABSTRACT

Transportation, route selection and optimization are intertwined in road network and these issues remain elusive to both planners and road users. The problems seized upon are an amalgamation as well as interplay of multiple factors – human, machine and nature. Thus, the optimal routing has become the uppermost concern of all the road users of the large road networks and the researchers, in turn, move heaven and earth to get a breakthrough in the invention of an algorithm that best suits the road user in saving him time, cost and distance by making an allowance for the road risk factors- both frequent and non-frequent aspects - related to road pavement, environment and human factors. Hence a pragmatic and user-friendly stance is attempted in the thesis.

Concepts that form the user-friendly qualities of road users – time, cost and distance – alone shape the aspirations of the thesis. Fuzzy logic is applied in achieving the above goals since it attempts to solve problems by assigning values to an imprecise spectrum of data in order to arrive at the most accurate conclusion possible in the same way that humans do.

The goal of optimal route selection in road network is attempted with three atypical approaches. The first kind is the hierarchical community mining – fuzzy ant dynamic routing on large road networks. Hierarchical community structure, fuzzy logic and ant colony system are applied in the study of the problem of route selection. The second approach is the use of Dijkstra’s fuzzy algorithm in the location of shortest path in large road networks using fuzzy parameters. The third scheme has a different perspective in route selection with the course of action modeled on code based community network. The community network is systematized through
postal index numbers and then fuzzy logic algorithm is implemented to accomplish the target.

Of all these approaches, it becomes apparent that the code based community approach is effective and efficient on several counts such as collection and storage of data and computation complexity.

To conclude, the present study, endeavouring to discover an optimal user friendly route in large road networks using fuzzy logic algorithm, has proven that a user decision support system in the selection of the optimal path in terms of efficiency based on road risk factors is professional and in real time operational mode.

This blueprint is highly economical that facilitates appreciable reduction in fuel consumption, significant rise in vehicle life span through the least wear and tear as well as the least maintenance cost. In addition, the fatigue, weariness and exhaustion of the drivers as well as the passengers are eliminated or shrunk to the bare minimum.

The current model could also be exploited as a platform for further study by the inclusion of still more dynamic parameters associated with large road networks to discover an even safer and more secure ‘good route’.